

Abstract of the Disclosure

An improved non-thermal plasma apparatus for treating NO_x bearing gas streams has a plasma reactor and an inlet and outlet. The plasma reactor is equipped with a plurality of dielectrically-coated electrodes between which a selected voltage is applied to generate a non-thermal plasma environment for driving selected electro-chemical reactions. A predefined voltage is applied across the electrodes to create microdischarges in the exhaust gas stream to convert nitric oxides into primarily nitrogen dioxides. The electrodes are constructed of metal plates, and a fluoropolymeric material, such as fluorocarbon, as the dielectrics. The electrodes are arranged in parallel formation and alternating between positive and negative charges. In one embodiment, fluoropolymeric spacers are positioned between adjacent electrodes and may be configured with selected thicknesses to provide a plurality of desired reaction zones or gaps therebetween. In another embodiment, the electrodes are supported on a specially configured fluoropolymeric (e.g., fluorocarbon) insulators adapted for placement inside the plasma reactor to provide a plurality of gaps. With a plurality of gaps, the total non-thermal plasma environment is expanded to increase the overall flow rate of the exhaust gas or throughput of the apparatus.